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ACADEMIC AND READING ACHIEVEMENT RELATED TO READING DIFFICULTIES.

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THE SELECTION AND TRAINING OF TEACHER AIDS FOR CLEVELAND'S ELEMENTARY SCHOOLS ARE DESCRIBED. EIGHTY WOMEN WERE CHOSEN FROM THE AID TO DEPENDENT CHILDREN ROLLS AND WERE ENROLLED IN A 5-MONTH TRAINING PROGRAM. THE PROGRAM WAS UNIQUE IN ITS PLAN TO TRAIN WOMEN WITH LESS THAN A HIGH SCHOOL EDUCATION. THE OBJECTIVES OF THE PROGRAM WERE TO DEVELOP HIGH LEVELS OF COMMUNICATION SKILLS WHICH WOULD MAKE THE WOMEN MORE EMPLOYABLE AND TO GIVE SPECIFIC TRAINING WHICH WOULD ENABLE THEM TO BE OF VALUABLE ASSISTANCE TO TEACHERS. PRETESTS AND POST-TESTS MEASURED READING SKILLS, VISUAL FUNCTIONING, AND AUDITORY DISCRIMINATION. READING PROFICIENCIES WERE SET AT THE FOURTH GRADE LEVEL FOR CANDIDATES FOR PRIMARY GRADES AND AT THE SEVENTH GRADE LEVEL FOR CANDIDATES FOR THE UPPER ELEMENTARY CLASSROOMS. TABLES PRESENT DATA SUCH AS TEACHERS' RATINGS OF THE ASSISTANTS' PERFORMANCE IN THE CLASSROOM. (MC)

WESTERN RESERVE UNIVERSITY
Cleveland College

ACADEMIC AND READING ACHIEVEMENT RELATED TO READING DIFFICULTIES

Edith M. Gaines and Lillian R. Hinds

Western Reserve University in cooperation with the Cleveland Board of Education, the Welfare Department, and Title V personnel through telephone calls, letters, and neighborhood meetings, invited Aid To Dependent Children Welfare clients to apply for selection as members of the Teacher Assistant Training Program.

Eighty of the 500 applicants were selected after a screening procedure which included (1) writing a paragraph about herself which was used to evaluate handwriting legibility, language usage, and spelling. (2) Completion of eight problems in simple and complex addition, subtraction, multiplication, and division. (3) An individual interview to gauge intelligence, motivation, personal problems, attitude towards children, and grammatically understandable speech. (4) Evaluation of the results of the Durrell Oral Reading paragraphs and the Wide Range Achievement Vocabulary test.

The 80 women were accepted for a five month teacher assistant training program. Goals were to develop high levels of communication skills to make these women generally more employable and to give specific training to enable them to be of valuable assistance to teachers in Cleveland's overcrowded city schools.

While teacher aides or assistants have been used in an increasing number of school systems in the past few years, there has been almost no specific training for the job. Most school systems have required high school graduates, and left the training entirely to the teacher for whom the aide was working.

This training program was unique in its plan to train women with less than high school education for teacher assistants in the elementary school. If dependent women, heads of households, could find employment in the public school with hours of work and vacation periods conveniently coinciding with their children's needs, a valuable road to independence would be established.

These women were to be paid from October 15, 1966 - March 17, 1967 from Title V funds. Continuing contracts as teacher's assistants were to be extended by the Cleveland Board of Education for the next school year should Cleveland's participating teachers evaluate the program favorably.

The Cleveland school system had requested that trainees be prepared to work in primary (kindergarten through 3rd grade) or upper elementary (4th through 6th grade). The training program was designed to include remedial reading, but it was decided on a pragmatic basis that applicants would need at least a 4th grade reading level at the beginning of the program in order to have a reasonable chance for success as a teacher assistant in primary grades. This would guarantee that they could read all the material presented in the classroom. For upper elementary placement, using the same criterion, it was planned to place in upper

elementary classrooms only those applicants who could read at a 7th grade level or above at the beginning of the program.

From a research point of view it was necessary (1) to find ways to measure and evaluate the progress of the assistants; (2) to determine the effectiveness of various methods of assessing the reading levels of these adults; (3) to identify the variables that affect growth in reading skills; (4) to select for statistical study the relationships between the dependent variable, reading, and the confounding variables which could affect reading success.

The women selected from Aid to Dependent Children rolls had to make personal application through screening procedures. These women were better motivated than many on welfare rolls. Since random sampling procedures could not be used, it is particularly important to control the variables affecting reading progress.

Age, sex, intelligence, ability to discriminate sounds, ability to discriminate among signs, ability to use one's eyes together, and self-image are among the variables which might affect results.

To measure and evaluate initial reading levels over subsequent progress, school grade levels attained were noted, pre and post tests were to be given as measured by the California Silent Reading Tests, the Durrell Oral reading paragraphs, the Wide Range Vocabulary test, the near-point lateral phoria and fusion (Keystone telebinocular cards) tests, the Cheiroscopic tracing test and the Wepman Auditory Discrimination test.

Tests of significance were necessary to determine the affectiveness of the methods used to assess the adult reading levels.

The Cleveland College - Western Reserve University training program shows frequency distribution tables for age and educational level, ie. grade completed.

TABLE I

AGE OF 80 WOMEN ENROLLED IN TEACHER ASSISTANT TRAINING PROGRAM

AGE	f
- 19	1
20 - 24	7
25 - 29	23
30 - 34	22
35 - 39	15
40 - 44	9
45 - 49	1
50 - 54	2

TABLE II

GRADE OF SCHOOL COMPLETED BY 80 WOMEN ENROLLED IN TEACHER ASSISTANT TRAINING PROGRAM

GRADE	f
7	2
8	5
9	14
10	16
11	11
12	28
12+	4

It may be noted that there is little relationship between grade completed and reading scores attained on the California Reading Test. The quality of instruction, number of students in the class, attendance of the student, social problems and pressures upon the student make for little relationship between grade completed and reading level. The availability or convenience of dates does not necessarily make it appropriate to use. The Durrell Oral Reading paragraphs show a significance at the level of .001 related to the comprehension section of the California Reading Test. Wide range vocabulary tests show good prediction at the higher levels but not so good at low levels.

TABLE III

INITIAL SCREENING TESTS
DURRELL ORAL READING PARAGRAPHS AND
WIDE RANGE VOCABULARY

GRADE PLACEMENT	DURRELL	WIDE RANGE
3rd	*	-
4th	3	-
5th	10	-
6th	21	1
7th	30	3
8th	*	4
9th	*	13
10th	*	10
11th	*	4
12th	*	7
13th +	*	1
	64	43

* Tested only through 7th grade

Since the purpose of this paper today is to focus on methodology and research procedures, let us pause here to point to the need for more rigorous statistical application. For example, Chi Square so frequently used as a test of significance to determine whether or not chance error has affected the outcome of two or more sample statistics or whether something significant has happened is not appropriate or exact for samples where the distribution is apt to result in expected frequencies of less than 5 in 1/4 or more of the cells or where the sample is less than 25. Fischer's exact test provides a more appropriate measure for the smaller samples. Furthermore other statistics are more appropriate for small cell frequencies:

eg. Kolmogorov Smirnov, as in a relative cumulative frequency where one variable is dichtomized into + and - the other variable must be on an ordinal scale. Each samples' relative cumulative frequency is obtained and compared. This is transformed into Chi Square.

$$\frac{4 D^2 \times N^1 \cdot N^2}{N^1 + (N^2)}$$

like 2 ogives drawn one for each level of the dichotomy and plotted. If the ogives are not equivalent, the farthest point apart is called D.

In attempting to compare two groups in which something different is being done with the experimental group one must ask, is the difference between the two groups greater than would be expected by chance? To answer this question the T test of difference of means for independent samples is required if the difference of means between two groups is at the same point in time. After training the two different groups are examined. A condition for this test, however, is homocidasticity or equal variability. When F shows non-equivalance the Cochran and Cox special modification of the T test is necessary. Failure to use this can result in inaccurate results.

If a measure of the mean difference before and after training of the same group is desired, a T test of difference of means for correlated samples is required since the same group is examined to see whether or not the mean difference of before and after scores within the same group is greater than would be expected by chance. Here the T test of differences with a different formula is used for correlated samples.

Helen Robinson, Charles Huelsman, George Spache and Lillian Hinds and others have found that a relationship between poor reading and poor visual function exist.

To determine whether or not poor fusion affects outcome the three measures already referred to were used.

Visual Function. "Psychologists estimate that 80% of the information we obtain from our external environment is by means of our visual pattern."[1] Manas points out that vision involves more than the optical sensory

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*Footnotes and copy from Lillian R. Hinds dissertation, "Evaluation of Words in Color or Morphologics-Algebraic Approach to Teaching Reading to Functionally Illiterate Adults" pp. 69-73 WRU Library, University Press.

[1]Leo Manas, Visual Analysis Handbook II, The Professional Press, Inc. 5 North Wabash Avenue, Chicago 2, Illinois, P. 19

structures but also entails a dynamic visual mechanism capable of making dramatic changes in its refractive status from the neural to the neuromuscular and finally to the muscular. He further says that "a skill is an acquired or developed ability to perform a given act efficiently."[1] Visual skills are measures of neuro-muscular coordination involving either or both the convergence or accommodative mechanisms and the essential feedback circuiting or are measures of the performance ability of the central integrative factor. It is possible to isolate and test some of these skills.[2]

Among these skills or factors as Eames[3] calls them are accommodation, the ability to maintain clear vision as the target nears the eyes; convergence, the inward movement of the eyes to maintain single vision as the target nears the eyes; motility, the ability to move the eyes smoothly and accurately in saccadic or in pursuit fixations; phoria, the relative alignment of the eyes horizontally and/or vertically, and fusion, the ability to integrate and use the visual information received from the two eyes so that the image is perceived as one single image. The reading act demands the maintenance of single vision. To achieve this, both eyes must focus on the same place on the page and must see clearly. This focus of the eyes must be adjusted properly for the distance which exists between the book and the eyes. These two requirements of the seeing act utilize different neurological mechanisms which must operate in perfect unison. If these two systems do not work together smoothly, the reader may have blurred vision, double vision, or use one eye some of the time and the two eyes together some of the time or alternate in the use of the left and right eye. Some learners have trouble in keeping and finding their place or in following a sentence to the next line and find it difficult to maintain quick smooth eye movements along the line. Some students manage to expend the necessary body energy for short lenghts of time and then the adjustments in accommodation, convergence, and motility exhaust them and they become sleepy or tired or nervous and give up the reading act. Because vision is such an important aspect of the reading process, the writer decided to determine whether or not the functional visual status of the students affected their ability to profit from instruction and whether the type of instruction affected functional vision. The Keystone Telebinocular provides a battery of tests for the purpose of evaluating visual skills.[4] The telebinocular was designed by William Sherman for the Keystone View Company producers of the instrument. It is frequently used by lay people and vision specialists alike in public school and reading clinic vision screening programs. Two tests from this battery were selected, the test of lateral phoria and the test of fusion.

The test of lateral phoria indicates the alignment of the eyes laterally. The testee is directed to look at the test card which has been placed on the Telebinocular 16 inches from the eyes. He is asked if he can see the arrow and the numbers at the same time. Here is verification of simultaneous

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[1] Ibid., p. 50

[2] Ibid.,

[3] Thomas H. Eames, "A Frequency Study of Physical Handicaps in Reading Disability and Unselected Groups, "Journal of Educational Research," XXIX (September, 1935), p. 2

[4] Lillian R. Hinds, "Blue Print for Visual Screening," (Euclid, Ohio: Euclid Public Schools, 1957 revision).

perception. Then the testee is asked where he first sees the arrow and where it travels so that observations can be made of the initial position of the arrow, the direction and movement of the arrow, and the range of movement of the arrow.

In the test for fusion, the testee is asked to look at the test card and to report immediately the number of balls that he sees. Possible responses are two balls, three balls, four balls, three balls which change to four balls, or two balls which change in color combination, or four balls which change to two, and then to three, or any other alternating combination already mentioned. If the testee sees three balls, it is necessary to determine whether or not these are in a straight line. This is a gross test for second degree fusion and usually is passed with ease according to Manas.[1]

Another test of functional vision was administered for the study. A cheiroscopic tracing was used to determine good hand-eye coordination and to measure binocular stability.[2] In this test the picture is placed on a drawing board behind the eye corresponding to the non-dominant hand. As the testee looks into the stereoscope, he traces the picture with a pencil. It seems to the testee that he is tracing directly over the picture, but he is really making a reproduction on the side of the paper corresponding to the dominant hand. If the drawing is traced in the appropriate place within the limitations prescribed by the test, the assumption is made that the visual communication entered a properly non-controlling eye, travelled through the communication center and visual pathways and out through the controlling eye with good or adequate coordination. The assumption is made that the eye and hand were used together adequately with the hand reinforcing the action of the eye. The failing of the eye-hand co-ordination test where the picture is drawn higher than the original could indicate hyperphoria associated with the eye corresponding to the dominant hand. If the drawn picture is lower than the original, the eye associated with the non-dominant hand was hyperphoria. If the tracing is not complete or is tilted to one side, it indicates a variable phoria. If the testee draws in the blank space some of the time and some of the time traces directly over the drawing, there is an indication of suppression of the eye corresponding to the dominant hand. An evaluation of the tracing permits analysis of the corresponding difficulty.

Chi square analysis failed to reveal significance between the California Reading Test graduated scores and either separate or combined measures of functional disability as revealed by tests of fusion, lateral phoria and cheiroscopic tracing.

It was necessary to analyze this failure in terms of procedure. The functional findings were lumped into either pass or fail scores which obscures a Monocular fail score ie. a person with poor function eliminates the use of <u>one</u> eye and is therefore no longer binocular, but one-eyed. This is a fail score which does

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[1]Manas, <u>op, cit.</u>, p. 62

[2]Ibid., p. 66

not inhibit achievement. The cut off point for good and poor reading was seventh grade. By 7th grade the person has passed the hurdle. Is this a cut-off point which permits discrimination?

Further to complicate things still more, research tells us that from 40-43 years of age nearly the entire population of that age requires vision care because of the onset of presbyopia. No control for age has been made so far.

In order to present research findings the project must be set up initially to provide random sampling. I.Q. scores and the other variables must be held constant. One also wonders if there is a sex difference in visual function. There usually are more boys than girls in remedial centers. This study deals with women only. Interesting available data, however, can be gleaned, such as the difference between reading level and grade completed related to visual function. Tests must be analyzed in terms of antecedents and meaning, for example two scores of 7th grade reading in an of themselves are meaningless. The place of schools attended and the circumstances surrounding attendance give other deeper meaning. A person completing 5th grade with a 7th grade score is a different person from a high school graduate with a 7th grade score.

If the Durrell is compared with the Comprehension test of the California, taking only the 46 cases in which the California scores fall between 3.7 and 7.9, the chi square is significant at the .001 level. The great majority of the cases fall within a - 1 to +1 variation in grade placement, whether the Durrell is compared to the California Comprehension or the California total score. Thus, the results point toward effective use of the Durrell to predict reading level through the 6th or 7th grade level. For persons scoring at the 7th grade level on the Durrell, some further indicator would be needed to see how much higher than that their reading level might be.

The Wide Range Achievement Vocabulary test, which was given to 48 of the applicants in the sample, helped to give an indication of higher reading levels. However, it was not nearly as accurate a predictor as the Durrell. The chi square did not show a significant relationship between grade placement score on the Wide Range and on the California total. Most of the Wide Range scores were definitely higher than the California, with the median falling in the 10.0 to 10.9 bracket. There is a little closer relationship between the Wide Range and the California vocabulary, but the Wide Range is still approximately 3 grades higher. If this 3-grade difference were anticipated, 82% of the 48 cases could have been appropriately placed on the basis of the Wide Range score. In 18% of the cases, however, the Wide Range score was 4 or 5 grades higher than the California score. In these extreme cases, the Durrell sometimes showed weakness in comprehension.

Sociological studies should not necessarily be limited to quantative measures. But unless studies are geared to the questions posed one is left in the position of having answers but not knowing what the question is.

The search for alternative explanations can be most fruitful. Perhaps with women it does not matter so much what the handicaps -- with some support they manage to overcome obstacles. That may be the nature of women!

Note on Authors:

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Appendix A

Table IV

TEST BATTERY AFTER ENTERING COURSE

A. CALIFORNIA READING TEST

Grade Placement Score	Vocabulary	Comprehension	Total (Vocabulary plus Comprehension)
3.0 - 3.9	4	2	2
4.0 - 4.9	11	12	13
5.0 - 5.9	1	3	2
6.0 - 6.9	5	9	8
7.0 - 7.9	23	20	20
8.0 - 8.9	8	9	8
9.0 - 9.9	2	8	5
10.0- 10.9	5	1	6
11.0- 11.9	4	-	-
12.0- 12.9	1	-	-
	64	64	64

B. VISUAL EXAMINATIONS

	Cheiroscope	Phoria	Fusion
Passed	3	20	28
Failed	64	47	39
	67	67	67

Passed 0 tests:	30
Passed 1 of 3 tests	23
Passed 2 of 3 tests	14
Passed all 3 tests	0
	67

C. WEPMAN AUDITORY EXAMINATIONS

- Percent correct

92.5 - 100	28
85.0 - 90.	19
77.5 - 82.5	12
70.0 - 75.	1
62.5 - 67.5	1
55.0 - 60.	1
	62

Appendix B

Table V

TEACHERS' RATINGS OF ASSISTANTS' PERFORMANCE IN THE CLASSROOM
(after two months of training)

1 + 2 -superior - good
3 -average
4 + 5 -acceptable - unsatisfactory

	Number of Ratings	1 + 2	3	4 + 5
CLASSROOM TASK				
1. Assisting in care of room and supplies	63	45	15	3
2. Record keeping and other clerical tasks	62	46	14	2
3. Checking papers with sorting key	67	56	8	3
4. Assisting with visual aids; putting work on board	55	34	18	3
5. Making ditto masters and running ditto machines	55	40	13	2
6. Operating various projectors	24	13	9	2
7. Supervising children in non-teaching routines	63	45	13	5
8. Supervising seatwork; help with reinforcing drills	54	36	14	4
GENERAL SKILLS				
1. Ability to follow directions accurately	65	50	12	3
2. Ability to plan and organize own work	64	39	23	2
3. Voice, enunciation and pronounciation	61	24	30	7
4. Handwriting and/or printing	63	28	26	9
5. English usage	65	27	30	8
6. Spelling	43	19	19	5
PERSONAL QUALITIES				
1. Appearance, grooming	59	51	6	2
2. Energy and enthusiasm	62	49	10	3
3. Dependability, attendance, promptness	62	42	12	8
4. Working under supervision and accepting criticism	62	52	7	3
5. Flexibility in new situations	58	43	11	4
6. Relationship with other staff members	57	46	7	4
7. Relationship with children (friendly, reserved, shy)	59	33	22	4

Appendix C

OPTOMETRIST'S REPORT

Herewith are the results of the complete visual examinations received by your Teacher assistants in our office. The following required only corrective lenses which have been prescribed.

1. O.W.
2. H.F.
3. D.S.
4. M.W.
5. L.B.
6. F.C.

The following would benefit from further Optometric Visual training. A short statement of problem follows the name.

1. M.R. - poor eyes and coordination and sight suppression.
2. C.M. - fusional and convergence problems.
3. E.A. - fusional and suppression problems.
4. F.F. - near fusional problems with suppression.
5. L.N. - poor fusional and convergence problems.
6. E.B. - convergence, insufficiency and fusional problems.
7. R.J. - poor fusional and convergence problems..
8. P.C. - suppression and poor convergence.
9. G.M. - poor accommodation convergence relations.
10. E.N. - intermitent suppression and poor convergence.
11. O.D. - poor fusional and convergence ability.

Of the above L.N., F.F., and E.A., did not require prescription lenses, but all have been instructed to return to our office in 6-8 weeks after receiving their prescriptions for an evaluation of progress. This progress evaluation is part of our total fee and is important for a more comprehensive diagnostic analysis.